USGS

# WATER RESOURCES RESEARCH GRANT PROPOSAL

**Project ID:** 2003GU21B

**Title:** Explore the Operational Effectiveness of Saipan's Existing Slow Sand Filter and Develop Recommendations to improve Operation of the Filter Plant

**Project Type:** Research

**Focus Categories:** Treatment, Water Supply, Surface Water

**Keywords:** Streams, Water Quality Control, Slow Sand Filter

**Start Date:** 03/01/2003

**End Date:** 02/29/2004

**Federal Funds Requested:** $26868.00

**Matching Funds:** $0.00

**Congressional District:** N/A

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**Abstract:** The Saipan slow sand filter facility was originally constructed in 1984 and it was rehabilitated in 1992. The system includes: a) a 20 million gallon storage reservoir catching direct rainwater runoff from Saipan International Airport (Isley Field), b) a pumping station next to the rainwater catchment reservoir that delivers water to the filters through an 8 inch PVC pipe, c) two parallel slow sand filters that are constructed of concrete and each measures 100 feet by 35 feet, d) a nearby reservoir that stores finished water from the filter. According to the Commonwealth Utility Commission (CUC), the Saipan slow sand filters have not been able to deliver the design flow, which is 350 gpm since 1993. A recent flow measurement indicates that the filters are delivering 50 to 60 gpm, which is 17 % of the design flow of 350 gpm. In addition, the Department of Environmental Quality (DEQ) does not have a record of data that shows how effective the filters are at removing bacteria and turbidity. The objective of this project is to monitor the quality and the quantity of the water that is being produced by the Saipan Slow Sand Filters, and then to make recommendations on how to improve the system operation in order to increase the finished outflow from the plant. To complete the project the following phases will be undertaken: 1) Filter preparation that includes draining the filters, repairing and installing new automatic control switches for the pumps, inflow and out flow valves, replacing the existing piezometers, and scraping the

top layer of the filters, 2) Monitoring and testing that includes daily monitoring of the turbidity, inflow and outflow rate, head loss measurement, and weekly monitoring of the inflow and out flow bacteria level, dissolved oxygen, ph level, and monthly monitoring of iron and manganese levels, 3) Evaluation of the information from above to determine the effectiveness of the filters in removing bacteria, reducing turbidity, and to determine filters run times between required scraping, 4) Report on how to improve the operation of the system.

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